MISSILE SYSTEMS DIVISION NOTE
MSDN 90-3

SOVIET BREAKOUT IMPLICATIONS UNDER START

AUGUST 1990

BY
C. HENDERSON

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Suite 800
1215 Jefferson Davis Highway
Arlington, Virginia 22202

This document reports research sponsored by the *Military Deputy for Acquisition, ASAF/A*, under *Contract F49620-86-C-0047*. These results do not necessarily represent Air Force official opinion or policy.

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ABSTRACT

The agreed provisions of the Strategic Arms Reduction Talks (START) treaty are expected to place well defined limits on the accountable warheads, missile launchers, and bombers that can be deployed by the superpowers. This paper discusses typical U.S. force structure options that would be permissible within the proposed treaty limits. It shows the likely effects on force totals of the complex counting rules permitted for penetrating bombers, and uses each side's total expected inventory of warheads as a basis for assessing the possibility and implications of a Soviet breakout. The results indicate that while a Soviet breakout with "nondeployed" missiles remains a present concern, that action may be counterproductive because such a move would not necessarily enhance their counterforce capability.

EXECUTIVE SUMMARY

This paper addresses the implications of a Soviet breakout on the alternative U.S. strategic force structure options being considered for deployment under START. It draws mainly from two unclassified sources that serve as the basis for the breakout analysis. No attempt is made here to predict precisely when, where, how, or even whether the Soviets might initiate a breakout. Such information would be highly classified and could not be analyzed in any substantial detail until all relevant aspects of the START treaty are finalized. Therefore, an objective of this paper is to discuss some of the issues that have been raised in public debate concerning a possible Soviet breakout and to show how those issues relate to the four strategic force structure options put forth by the Bush Administration.

A report prepared by the House Armed Services Committee's Defense Policy Panel on U.S. Strategic Forces and START in May 1988 outlined many of the congressional concerns with regard to existing START proposals and described some of the ways that the Soviets might cheat on provisions of the treaty.

Although specific proposals were introduced by the U.S. to reduce the opportunity for cheating, at this writing some issues (notably the limit on nondeployed missiles) remain unresolved. After analyzing the breakout approach described in the HASC report and applying it to each of the four alternative U.S. strategic force options, we conclude that the options, as presented, would neither encourage nor discourage a Soviet breakout. Furthermore, they all would be affected equally should such an eventuality occur. The

possible reasons for a Soviet breakout were not discussed in the HASC report. Moreover, that report illustrated convincingly that under current START proposals both sides will be accountable for reducing their strategic nuclear warheads from about 12,000 to 6,000, but the complex counting rules will, in fact, allow each side to deploy about 10,000 warheads. This would imply that a status quo situation should remain in effect after the treaty is implemented, and the Soviets should have little incentive to break out.

For the most part, our analysis agrees with this premise that both sides will continue to have a substantial number of warheads to meet their respective targeting needs. However, the warheads are very likely to be redistributed among the separate legs of the Triad in such a manner that there may be a perceived weakening of one or more of the legs. For example, with the exception of U.S. strategic force Option I, which has 850 silos, the remaining options have 700 or fewer silos to draw down the 1,540 warheads carried by the Soviet SS-18 ICBMs. Although some expert witnesses testifying before the HASC panel have expressed some concern about the possibility of a drastically reduced U.S. silo-based ICBM force under START, when this situation is viewed from a slightly different perspective, we see that it should give the Soviets absolutely no incentive to break out with additional SS-18 hard-target-capable warheads.

Understandably, if the Triad is to remain viable, then U.S. mobile ICBM missiles must compensate for any perceived vulnerability of the silo-based ICBM force. This leads to the question of whether or not the Soviets might break out with a barrage attack against U.S. mobile missiles. In this case, we postulate a Soviet deployed force augmented

with nondeployed, spare missiles mounted on clandestinely prepared soft-site launchers. They might also use undeclared, illegal mobile missiles, but as was emphasized in the HASC report, it would be extremely difficult to determine how many of those particular missiles might be hidden in sheds in the Soviet Union prior to the signing of the treaty.

Based on the assumption included in the HASC report, which stated that the Soviets might break out with nondeployed missile forces equal in number to deployed forces, we conclude that, while they might have enough warheads to barrage attack 200 Small ICBM HMLs, they might have some difficulty barraging 500. This is a result of the need to include in the breakout spare SS-18 missiles, which are not easy to handle surreptitiously due to their weight and size.

A possible Soviet barrage attack on the other two legs of the Triad (bombers and submarines) was not discussed in this paper because of the high degree of position location uncertainty normally associated with these systems once they are launched. Under the START treaty, mobile missiles will be based in restricted areas and deployed in specific areas that can be monitored by national technical means.

Finally, we show that although it would be both risky and costly for the Soviets to break out for the purpose of barraging the Small ICBM, one way for the United States to discourage such a breakout would be to deploy 500 HMLs in a Random Movement basing mode in the desert southwest. Then, by dispersing them widely on both strategic and tactical warning, the likelihood of a successful barrage attack would be diminished significantly.

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I. INTRODUCTION

U.S. and Soviet proposals to reduce strategic nuclear weapons under the Strategic Arms Reduction Talks (START) are aimed at limiting the total number of launchers/platforms and warheads that either side can deploy. The arms control process has been further complicated in these talks because some of the proposed counting rules are complex and permit certain launchers/platforms to be counted as having fewer warheads than they actually can carry. Although the counting rules introduce an element of imprecision, their implications with regard to the number of real warheads that can be deployed are reasonably predictable. Therefore, a more pressing issue for the United States is the question of how many nondeployed weapons the Soviets could rapidly add to their deployed arsenal, if and when they chose to break out from the treaty.

The purpose of this paper is to examine the impact of breakout on the different U.S. START force structure options identified by the Bush Administration. We should note at the outset that the Administration's decision to reconsider its previous proposal to ban land mobile missiles should help to reduce the number of force structure options that need to be evaluated. However, the no-mobiles options are retained for comparison purposes in this analysis because recent budgetary pressures have prompted many high ranking officials to recommend foregoing the U.S. deployment of mobile missiles.

In the absence of U.S. mobile missiles, a Soviet breakout might be directed toward the bomber and submarine legs of the U.S. Triad, but the target position location uncertainty problem would be more severe and a barrage attack less likely in those cases.

II. BACKGROUND

During hearings on U.S. Strategic Forces and START held in May 1988 by the House Armed Services Committee's Defense Policy Panel, several witnesses indicated that current reduction plans proposed for START may increase the ratio of Soviet offensive warheads to the number of aimpoints that constitute the U.S. retaliatory capability. This implies a disproportionate reduction in U.S. silos as compared with a treaty-imposed reduction in Soviet hard-target-killer warheads.

A more surprising aspect of the START reduction plans was brought out in the Panel's report [Ref. 1], which showed convincingly that whereas the public perceives that a START treaty will reduce strategic nuclear warheads on both sides from about 12,000 to 6,000, the complex counting rules will, in fact, allow each side to deploy about 30,000 warheads. Furthermore, a Soviet breakout would enable them to augment their deployed forces by an additional 10,000 warheads. (Steps to reduce this last total have been proposed.)

It is apparent from the Panel's report that START will not reduce nuclear warheads significantly. Moreover, the incentive for Soviet cheating may become high because of their desire to gain an advantage over treaty-limited U.S. ICBM forces. Recognizing this problem, former Secretary of Defense James Schlesinger testified before the Panel that the Soviets could hide a large number of their missiles in sheds, not in designated areas for inspection. He also pointed out, as an example, that whereas the INF treaty permits inspections in designated deployment areas (DDAs) representing 20,000 square miles, the entire Soviet Union consists of 11 million square miles [Ref. 1, Hearings].

It should be noted that a Soviet breakout would not necessarily require the use of illegal or undeclared missiles, although it would be extremely difficult to determine how many existing nondeployed missiles remained undeclared at the time a treaty is signed.

The Defense Policy Panel's minority report [Ref. 1] included the following statement concerning this problem:

> "It is, for example, inconceivable to think that the United States could construct an accurate baseline data base of the thousands of existing Soviet strategic forces as part of START without demanding such intrusive measures as to pose a risk to sensitive U.S. facilities. Even then, if the Soviets were determined to hide systems from U.S. monitoring efforts, they could do so with ease."

This means that there would always be a question in the minds of U.S. planners concerning the number of illegal weapons that the Soviets could add to a breakout force. But the legal, nondeployed missiles, on the other hand, could pose an equally ominous breakout threat because the Soviets would need only to hide the preparations for their use and not the missiles themselves.

Both the United States and the Soviets would be permitted to build and store legal spare missiles. (Limits are to be placed on nondeployed mobile missiles.) Large stockpiles of declared, nondeployed missiles could result if both sides are not willing to accept limits on all of their nondeployed missiles. Then, if the United States could not continuously monitor the missile storage locations, the Soviets could clandestinely augment their treaty-limited deployed force by placing the spare missiles on hidden, soft-site launch pads.

The Soviet SS-18 silo-based missile is cold-launched, while their mobile missiles, the SS-24 rail and the SS-25

land, are canister-launched from railcars, and truck launchers, respectively. This attribute provides those launchers with a reload capability, but more importantly, it would permit the respective missiles to be launched from very rudimentary test stands.

A complete assessment of exactly how the Soviets would prepare for a breakout is beyond the scope of this paper. Our primary concern is whether or not the United States can maintain deterrence by formulating a force structure under START that will discourage them from breaking out. To this end, we start with the premise that the Soviets could cheat and could have a total excess of 10,000 warheads over deployed levels (as estimated in the HASC Defense Policy Panel report). Then the question to be addressed is how would a U.S. strategic force that was shaped by START limits be adversely affected by such a Soviet action.

We should note that steps have been taken by START negotiators to incorporate provisions in the treaty that would discourage cheating, e.g., on-site inspection, limiting the number of nondeployed mobile missiles, storing the "nondeployed" away from missile deployment areas, tagging mobile missiles, etc. While it is true that these actions, if implemented, could reduce the number of Soviet excess warheads over deployed levels to less than 10,000, this aspect of the treaty has not been resolved fully. Therefore, there needs to be an examination of both a worst case and a best case breakout possibly.

III. DISCUSSION

The United States and Soviet Union are still negotiating the provisions of a START treaty, but they have agreed to several well publicized limits. These include a ceiling of 1,600 Strategic Nuclear Delivery Vehicles (SNDVs) comprised of ICBM launchers, SLBM launch tubes, and heavy bombers; and a limit of 6,000 warheads, no more than 4,900 of which may be carried by SLBMs and ICBMs and of these, no more than 1,540 may be carried on the Soviet SS-18 heavy ICBM.

According to the counting rules that have been agreed upon, the SS-18 and Peacekeeper would be counted as having 10 warheads each. Penetrating bombers that carry only nuclear gravity bombs and/or Short-Range Attack Missiles (SRAMs) would count as having only one warhead, even though the actual payload carried could be many more. The two superpowers agreed to have different methods for counting ALCMs. The United States can have up to 150 of their bombers carrying ALCMs charged with 10 warheads each even though the number they can actually carry can be up to 20, while the Soviets can have up to 210 ALCM carriers accountable for 8 warheads each although the actual number of warheads carried onboard could be up to 12.

There are many other limits under consideration that both sides have yet to agree upon. For example, the United States wants to limit nondeployed mobile missiles (spares) to 300 or 1,500 attributable warheads, while the Soviets prefer a smaller limit and would ban the storage of nondeployed missiles near designated deployed missile sites. Also, the United States and the Soviets have agreed on a limit of 1,100 mobile ICBM warheads.

Since the announcement of the particular treaty limits that both sides are in general agreement with, there has been considerable speculation in the defense community as to what the opposing strategic force structures might look like under START. Uncertainty regarding the Soviet force structure composition will continue, however, in response to a congressional request, the Bush Administration directed the Pentagon to develop several alternative U.S. strategic START force options.

A. U.S. START Force Candidates

In a report to Congress, the Bush Administration outlined four different U.S. strategic force postures under a START treaty, each calling for 132 B-2 bombers and each containing suboptions with and without mobile missiles [Ref. 2]. (Secretary of Defense Cheney decided to cut the B-2s planned to 75 [Ref. 3]). Because of the special counting rules for bombers, the Administration has placed a premium on penetrating bombers. This led to the proposed force structure candidates that are characterized by a fixed bomber force and a varied ballistic missile force, which is a product of the tradeoffs imposed on the ICBMs and SLBMs. Some persons, and in particular, members of Congress, would argue that therein lies the crux of the problem with the START treaty limits established thus far.

During the first week in May 1988, Congress (the House) passed a resolution stating that the number of U.S. SSBNs should not be reduced below 20. The reason given for this concern is the possible threat posed by Soviet attack submarines that would not be constrained by treaty and, furthermore, could concentrate their tracking on no more than 12 submarines--the two-thirds of the U.S. Trident force at sea.

As will be shown later, when this type of lower limit is placed on the SLBM platforms, it results in an upper limit constraint on the number of ICBMs that can be deployed. Together, these two limiting conditions serve to reinforce the argument made by some strategic policy experts such as Richard Perle and J.R. Schlesinger [Ref. 1, Hearings] that the effect of the START treaty would be to increase the number of Soviet RVs in relation to U.S. aimpoints. Out of concern for this aspect of the arms reduction agreement, many experts, including Richard Garwin [Ref. 1, Hearings], have recommended deMIRVing the U.S. ICBMs so that 1,000 silos could be retained. Others such as J.R. Schlesinger [Ref. 1, Hearings] believe that offloading SLBMs by permanently altering the launch tubes on the Trident boats may be a solution.

Although some of these suggestions may eventually become a part of the U.S. strategic force posture, they are not included now in the four options put forth by the Administration. Table 1 shows the percent distribution of nuclear warheads among the three U.S. Triad legs for each of the four options. Based on the special counting rules proposed by the United States whereby a penetrating bomber counts as 1 warhead and an ALCM carrier counts as 10 warheads, the bomber warheads (18 percent of the total) are clearly undercounted, because in terms of the real or actual weapons carried, the bomber weapons would constitute almost 50 percent of the START force.

Starting with Option I, which includes the equivalent of 15 fully loaded boats (the lowest number of SLBMs being considered by the Administration), the percentage of warheads carried by SLBMs rises from 31 percent to 44 percent in Option IV, where there are 22 boats. This, in turn, causes the percentage of warheads carried by ICBMs to

TABLE 1
U.S. TRIAD WARHEAD DISTRIBUTION
(Percent of START Totals)

Alternative U.S. START Force Postures	Bombers	ICBMs	SLBMs
Option I			
Real Warheads	48	21	31
Counting Rule Warheads	18	34	48
Option II			
Real Warheads	48	15	37
Counting Rule Warheads	18	24	58
Option III			
Real Warheads	48	11	41
Counting Rule Warheads	18	18	64
Option IV			
Real Warheads	48	8	44
Counting Rule Warheads	18	11	71

See Tables 2 through 9.

fall from 41 percent in Option I to 8 percent in Option IV. Options II and III consist of intermediate quantities of Trident submarines--18 and 20, respectively--which result in SLBM percentages of 37 and 41 percent, while the ICBM percentages are 15 and 11 percent for those options, respectively.

The above tradeoffs illustrate quite vividly the hard choices that must be made regarding the composition of the ballistic missile force deployed in a START environment. Moreover, the Triad-mix percentages by themselves tell only part of the story. There is still the need to examine each candidate force structure's specific makeup. These are shown in Tables 2 through 9.

These tables contain assumptions that were included in this analysis for purposes of uniformity and consistency, and may represent slight deviations from the real force totals envisioned by the Administration. First, the number of nuclear warheads that can be carried by U.S. bombers varies from 12 to 24. In this analysis, we assume that each penetrating bomber can carry 16 real warheads, but is counted as having only 1, while each ALCM platform can carry 20 real warheads, but is counted as having 10. Second, the Administration did not specify the number of Trident submarines in each option but, instead, elected to specify a total number of SLBMs. We can translate that number into the number of platforms shown in the tables by assuming that the full 24 tubes are used on each boat. Finally, the number of SLCMs shown was derived from the HASC Defense Policy Panel's report, however, the politically-binding SLCM limit agreed to is 880 [Ref 4.].

Although there are myriad ways to configure the U.S. force structure under the START limits, there are also certain practical considerations that must be taken into

TABLE 2
U.S. FORCE STRUCTURE OPTION IA
(No Mobiles, Low SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 *	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Silo	50	50	10	10	500	500
MM III	350	350	3	3	1,050	1,050
MM II	450	450	1	1	450	450
ICBM Totals	850	850			2,000	2,000
SLBMs						
Trident II	15	360	8	8	2,880	2,880
START Totals	1,129	1,474			9,472	5,972
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	1,229	1,574			10,272	5,972

SOURCE: Ref. 1 and 2 (modified).
* Ref. 3. (132 reduced to 75)
Note: The ICBMs are deployed in 50-missile squadron units (Tables 2 thru 9).

TABLE 3
U.S. FORCE STRUCTURE OPTION IB
(Mobiles, Low SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 **	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Rail	25	50	10	10	500	500
MM III	300	300	3	3	900	900
SICBM*	200	200	1	1	200	200
MM II	400	400	1	1	400	400
SICBM*	500	500	1	1	500	500
MM II	100	100	1	1	100	100
ICBM Totals	925	950			2,000	2,000
SLBMs						
Trident II	15	360	8	8	2,880	2,880
START Totals	1,204	1,574			9,472	5,972
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	1,304	1,674			10,272	5,972

* SICBM Alternative Options
SOURCE: Ref. 1 and 2 (modified).
** Ref. 3. (132 reduced to 75)

TABLE 4
U.S. FORCE STRUCTURE OPTION IIA
(No Mobiles, Med SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 *	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Silo	50	50	10	10	500	500
MM III	150	150	3	3	450	450
MM II	450	450	1	1	450	450
ICBM Totals	650	650			1,400	1,400
SLBMs						
Trident II	18	432	8	8	3,456	3,456
START Totals	932	1,346			9,448	5,948
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	1,032	1,446			10,248	5,948

SOURCE: Ref. 1 and 2 (modified).
* Ref. 3. (132 reduced to 75)

TABLE 5
U.S. FORCE STRUCTURE OPTION IIB
(Mobiles, Med SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 **	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Rail	25	50	10	10	500	500
MM III	100	100	3	3	300	300
SICBM*	200	200	1	1	200	200
MM II	400	400	1	1	400	400
SICBM*	500	500	1	1	500	500
MM II	100	100	1	1	100	100
ICBM Totals	725	750			1,400	1,400
SLBMs						
Trident II	18	432	8	8	3,456	3,456
START Totals	1,007	1,446			9,448	5,948
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	1,107	1,546			10,248	5,948

* SICBM Alternative Options
SOURCE: Ref. 1 and 2 (modified).
** Ref. 3. (132 reduced to 75)

TABLE 6
U.S. FORCE STRUCTURE OPTION IIIA
(No Mobiles, High SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 *	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	870
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Silo	50	50	10	10	500	500
MM III	50	50	3	3	150	150
MM II	400	400	1	1	400	400
ICBM Totals	500	500			1,050	1,050
SLBMs						
Trident II	20	480	8	8	3,840	3,840
START Totals	784	1,244			9,482	5,982
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	884	1,344			10,282	5,982

SOURCE: Ref. 1 and 2 (modified).
* Ref. 3. (132 reduced to 75)

TABLE 7
U.S. FORCE STRUCTURE OPTION IIIB
(Mobiles, High SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 **	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Rail	25	50	10	10	500	500
SICBM*	200	200	1	1	200	200
MM II	350	350	1	1	350	350
SICBM*	500	500	1	1	500	500
MM II	50	50	1	1	50	50
ICBM Totals	575	600			1,050	1,050
SLBMs						
Trident II	20	480	8	8	3,840	3,840
START Totals	859	1,344			9,482	5,982
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	959	1,444			10,282	5,982

* SICBM Alternative Options
SOURCE: Ref. 1 and 2 (modified).
** Ref. 3. (132 reduced to 75)

TABLE 8
U.S. FORCE STRUCTURE OPTION IVA
(No Mobiles, Very High SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 *	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Silo	50	50	10	10	500	500
MM II	150	150	1	1	150	150
ICBM Totals	200	200			650	650
SLBMs						
Trident II	22	528	8	8	4,224	4,224
START Totals	486	992			9,466	5,966
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	586	1,092			10,266	5,966

SOURCE: Ref. 1 and 2 (modified).
* Ref. 3. (132 reduced to 75)

TABLE 9
U.S. FORCE STRUCTURE OPTION IVB
(Mobiles, Very High SLBMs)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
B-2	75 *	75	16	1	1,200	75
B-1B	97	97	16	1	1,552	97
ALCMs						
B-52H	92	92	20	10	1,840	920
Bomber Totals	264	264			4,592	1,092
ICBMs						
PK Rail	25	50	10	10	500	500
SICBM	150	150	1	1	150	150
ICBM Totals	175	200			650	650
SLBMs						
Trident II	22	528	8	8	4,224	4,224
START Totals	461	992			9,466	5,966
	Weapons that are not treaty-limited					
SLCMs:TLAM/N						
Submarines	50	50	6	0	300	0
Ships	50	50	10	0	500	0
GRAND TOTALS	561	1,092			10,266	5,966

SOURCE: Ref. 1 and 2 (modified).
* Ref. 3. (132 reduced to 75)

account. They include the cost of acquiring new systems, e.g., 200 or 500 Small ICBMs; the limited availability of existing systems, e.g., 450 Minuteman II missiles and 97 B-1B bombers; and the standard loading of bombers and missiles necessary to meet the often disparate requirements of range, payload, penetration aids, target hardness, and coverage. As mentioned previously, it may be desirable to download SLBMs or to deMIRV the older ICBMs in order to retain a large number of SNDVs. However, Table 2 shows that Option IA is already close to the 1,600 limit, and the number of silo launchers in that option is 850--a value that is somewhat lower than the existing 1,000 silo force.

Reviewing U.S. force structure Option I, we see a total of 2,880 SLBM warheads, and this means that out of 4,900, 2,000 deployed missile warheads can be allocated to the ICBMs. When this combined total is added to the bomber totals (4,592 real warheads or 1,092 counting rule warheads), then the START totals would be 9,472 real warheads, which correspond to 5,972 counting rule warheads. (The Air Force policy of deploying missiles in silos in units of 50 is the reason that the START totals vary among the options.) The bomber totals remained constant for each option, while the ICBM warheads were traded for higher numbers of SLBM warheads in the subsequent options.

Each of the mobile missile options analyzed included either 200 or 500 single-RV Small ICBMs, in addition to 50 Peacekeeper missiles on 25 trains. The remaining ICBM warhead requirements were supplied by adding an appropriate number of existing Minuteman II and III missiles. The mobile missile options are presented in Tables 3, 5, 7, and 9. We should note that if, for example, the mobiles consisted of only 50 Peacekeeper in Rail Garrison, then

Tables 2, 4, 6, and 8 could be treated as if they also contained mobiles, provided that the number of platforms shown was changed to account for the 25 trains required rather than the 50 silos.

Comparing Tables 2 and 7 (Option IA and IIIB, respectively) we can see, for example, that by increasing the SLBM warheads by 33 percent the ICBM warheads would be reduced by about 48 percent. Moreover, if 500 of those ICBM warheads were carried by Peacekeeper in Rail Garrison and 500 by Small ICBMs (Option IIIB), then going from Option IA to IIIB would reduce the silo force from 850 to 50 launchers. Table 9 (Option IVB) represents an extreme case in that the addition of 2 more Trident II submarines (from 20 to 22) would result in zero silo-based warheads, 500 Peacekeeper Rail warheads, and only 150 Small ICBM warheads. Therefore, the four U.S. force structure options cover the complete range of strategic nuclear postures--from a minimum of SLBMs and a pure silo-based ICBM force to a maximum of SLBMs and a pure mobile ICBM force.

B. Soviet START Force Candidates

The Soviets have never agreed to a ban on mobile land-based missiles because of their concern for the hard-target-kill capability of both the U.S. Peacekeeper and Trident D-5 missiles. Recognizing this threat to their silo-based missiles, they have developed the SS-24 rail mobile and the SS-25 land mobile missiles. These two systems could eventually provide the Soviets with the means to enhance the survivability of about one-half of their ICBM warheads because the mobile launchers carrying them could not be readily targeted by U.S. forces.

The Bush Administration's decision to drop its proposed ban on mobile missiles reflects its desire to encourage Congress to fund both the Peacekeeper in Rail Garrison and the Small ICBM [Ref. 5]. The Soviets undoubtedly would like to hold both of these strategic weapon systems at risk. But to do so by agreeing to a ban on mobiles would prevent them from achieving the survivability of their own SS-24 rail and SS-25 land mobile missiles. However, a ban on MIRVed mobile missiles has been discussed.

The Soviet strategic force structure shown in Table 10 was derived from the HASC Defense Policy Panel's report [Ref. 1]. It has been modified to reflect the agreed counting rules for Soviet ALCMs as well as a hypothetical ban on MIRV mobiles, which has been discussed but not proposed. This table is in contrast to Table 11 which includes both mobiles and restricts their total warheads to the agreed limit of 1,100.

Tables 10 and 11 are not intended to serve as predictions of Soviet force structures. They show illustrative examples of how the Soviets might configure their strategic nuclear forces under START. We emphasize that while there are many other ways in which they might structure their forces, the examples shown here fall within the proposed START limits and can be used to illustrate the implications of START on the Soviet strategic forces.

Table 11 shows a possible treaty-limited Soviet force structure comprising 275 bombers, 570 ICBMs, and 404 SLBMs. Unlike the United States, which places a premium on heavy bombers, the Soviets are very likely to continue to emphasize the importance of their ICBMs, even though the special counting rules would allow their bombers to carry about 4,000 to 5,000 real warheads as compared with the 2,640 real warheads carried by their ICBMs in this example.

TABLE 10
SOVIET FORCE STRUCTURE OPTION A
(No MIRVed Mobiles)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
Blackjack	200	200	16	1	3,200	200
ALCMs						
Bear H	75	75	12	8	900	600
Bomber Totals	275	275			4,100	800
ICBMs						
SS-18 Mod 5	154	154	10	10	1,540	1,540
SS-24 Silo	112	112	10	10	1,120	1,120
SS-25 Land	340	340	1	1	340	340
ICBM Totals	606	606			3,000	3,000
SLBMs						
SS-N-23	14	224	4	4	896	896
SS-N-20	5	100	10	10	1,000	1,000
SLBM Totals	19	324			1,896	1,896
START Totals	900	1,205			8,996	5,696
	Weapons that are not treaty-limited					
SLCMs:SS-N-21						
Submarines	50	50	8	0	400	0
GRAND TOTALS	950	1,255			9,396	5,696

SOURCE: Ref. 1 (modified).

TABLE 11
SOVIET FORCE STRUCTURE OPTION B
(Mobiles)

	Platforms	SNDVs	Real Warheads Per SNDV	Counting Rule Warheads Per SNDV	Real Warheads	Counting Rule Warheads
Bombers						
Blackjack	200	200	16	1	3,200	200
ALCMs						
Bear H	75	75	12	8 *	900	600
Bomber Totals	275	275			4,100	800
ICBMs						
SS-18 Mod 5	154	154	10	10	1,540	1,540
SS-24 Rail	38	76	10	10	760	760
SS-25 Land	340	340	1	1	340	340
ICBM Totals	532	570			2,640	2,640
SLBMs						
SS-N-23	19	304	4	4	1,216	1,216
SS-N-20	5	100	10	10	1,000	1,000
SLBM Totals	24	404			2,216	2,216
START Totals	831	1,249			8,956	5,656
	Weapons that are not treaty-limited					
SLCMs:SS-N-21						
Submarines	50	50	8	0	400	0
GRAND TOTALS	881	1,299			9,356	5,656

SOURCE: Ref. 1 (modified).
* Ref. 4 (US/USSR Summit Agreements).

The 154 silo-based SS-18 Mod 5 missiles would continue to represent the Soviets' prompt hard-target-kill capability, while the rail and land mobile systems could provide a survivable and enduring postattack strike force. The START totals for the Soviet systems shown in Table 11 are somewhat lower than those previously shown for the U.S. systems. The data are presented in this manner only because present weapon inventories differ in that same way.

C. Soviet Breakout Potential

According to the HASC Defense Policy Panel's report, the Soviets could add about 10,000 warheads to their treaty-limited deployed forces under START by taking the following three actions: (1) upload ICBMs and SLBMs to their full capacity, (2) prepare spare missiles for launch from hidden launching stands, and (3) equip wide-body transports with ALCMs and launcher racks. These activities may or may not be detectable by U.S. monitoring means. Nevertheless, they represent potential ways in which the Soviets could circumvent the START treaty limits.

Table 12 shows the breakout scenario presented in the Panel's report. The authors of that report acknowledged that, because of its large size, the SS-18 missile might not be suited for a rapid breakout force. In that event, the total number of breakout weapons would drop from 10,816 to 8,660.

While 8,660 additional weapons is a substantial quantity, the absence of ádditional SS-18s raises the question of exactly what the Soviets would hope to accomplish with a breakout. The Panel's report suggests that the accuracy of the SS-24 and SS-25 might be improved to make them hard-target capable, but this is questionable for Soviet mobile launchers. Therefore, inasmuch as the

TABLE 12
SOVIET BREAKOUT SCENARIO
(Option A)

Delivery Vehicle	Uploaded Delivery Vehicle Capacity	Legal Spare Delivery Vehicles	Total Warheads on Spare Delivery Vehicles	Excess Warheads on Deployed Delivery Vehicles
ICBMs				
SS-18-Mod 5	14	154	2,156	616
SS-24 Silo	10	112	1,120	0
SS-25 Land	1	340	340	0
SLBMs				
SS-N-23	10	224	2,240	1,344
SS-N-20	10	100	1,000	0
ALCMs				
Transports	10	200	2,000	0
TOTALS			8,856	1,960
Total excess over deployed levels: 8,856 + 1,960 = 10,816				

SOURCE: Ref. 1.

Soviets probably would have about 10,000 real warheads as a result of the treaty's special counting rules, and a like number of weapons already provides them with an adequate deterrence, there needs to be some other justification for them to risk detection in preparing for a breakout.

The most obvious reason for the Soviets to augment their deployed forces would be to use the additional warheads to ensure complete target coverage in a preemptive, counterforce strike against the United States. In other words, if the number of treaty-limited weapons of a particular type is not sufficient to carry out a successful first strike attack, then the Soviets might be inclined to break out. Also, if the United States decides to deploy a Strategic Defense System that is outside the provisions of the ABM treaty, the Soviets might feel the need to have additional offensive weapons to counter either a totally or a partially deployed U.S. ballistic missile defense system. Finally, from a correlation of forces standpoint (which places a premium on the residual forces remaining after a major nuclear exchange), the Soviets may seek to obtain an advantage by initiating the exchange with forces highly asymmetric in their favor.

Only the first strike incentive is addressed here, because the SDI and correlation of forces incentives are beyond the scope of this paper. In this analysis, we can readily assess the Soviets' first strike capability by comparing their START force structure with the U.S. force structure options.

Referring back to Table 10, we see that even if the Soviets maintained a large reserve force of SS-25s and SS-N-20s, they still would have available 1,540 hard-target warheads plus 2,016 other prompt-target warheads. When this Soviet force is matched against the four U.S.

strategic force options, only the silo-based force in Option IA could not be covered completely in a silo attack.

The 850 silo targets shown in Table 2 (Option IA) would need to be targeted by at least 1,700 RVs in a 2-on-1 attack. Since the treaty-limited Soviet SS-18 force would fall short of this number, the Soviets must either accept the fact of being able to target only 770 (91 percent) of the 850 silos with 2 RVs or else upload the SS-18 to 14 RVs per missile and, thereby, have the capability to target all of the U.S. silos with a 2-on-1 RV attack.

The remaining U.S. strategic force options all have 700 or fewer silos and, therefore, are all subject to a 2-on-1 attack by the Soviet SS-18 START force. At first glance, it would appear that the Soviets would not need to augment their hard-target-kill force. However, hypothetically, this situation might have been entirely different if the 50 silo-based Peacekeeper missiles shown in Table 2 had been reconfigured as a Carry-Hard system for deployment in a field of 1,000 empty holes used for deception. (Carry-Hard is no longer a basing option for Peacekeeper, but might be considered for future U.S. missiles.)

Then for this example, the Soviets would need 1,700 RV weapons for a 2-on-1 attack against the Minuteman silos plus 2,000 RVs for the same type of attack against the Carry-Hard silos. Faced with this situation, they might choose to break out with 154 additional SS-18 missiles (the spares); otherwise, they would be forced to make a choice between allowing either 500 Peacekeeper warheads or 1,500 Minuteman warheads to go unchallenged in the first strike attack.

This purely hypothetical example was introduced only to illustrate a paradox. Common sense tells us that the United States should maintain a large enough set of

hard-target aimpoints (including those used mainly for deception) so that a treaty-limited Soviet SS-18 force could not possibly cover all of the silos that actually contained ICBMs. And yet for the United States to do so would provide the Soviets with an incentive to break out. Moreover, such a breakout would completely negate the United States's temporary advantage gained in the number of aimpoints as compared with the number of attacking RVs.

At the opposite end of the spectrum, Option IVB would have zero silos. In this case, a Soviet breakout might be unlikely; but in the absence of any U.S. silo targets to draw down the SS-18 force, Soviet planners might be inclined to use those weapons for selectively barraging the Peacekeeper and Small ICBM mobile missiles.

Options IB, IIB, and IIIB are identical with respect to the number of mobile missiles to be deployed. The various options are shown in summary form in Table 13. We see from this table that, depending on the option the United States selects, on any given day the Soviets would face a total of about 4,800 to 5,400 strategic nuclear warheads. If their intent is to strike first from a covertly generated posture, then under the START treaty limits they could have about a 2-to-1 advantage in weapons. Therefore, under these circumstances a breakout to achieve a 2-to-1 weapon advantage would serve little purpose, unless the additional weapons were going to be used to barrage U.S. mobile missiles.

A barrage attack against the Peacekeeper trains probably would not succeed if the train crews had more than 6 hours of strategic warning (SW). The Small ICBM HMLs, on the other hand, would rely on tactical warning (TW), which is expected to be only as long as the time of flight of an attacking missile. In general, a blind area barrage attack

TABLE 13
CRITICAL U.S. TRIAD FEATURES
(Platforms/Launchers/Warheads)

Force Structure Option	Hard Silos	SW* Mobiles	TW** Mobiles	55% and 30% Alert Bombers	60% Alert SSBNs	Total Warheads
IA	850/2,000	0	0	98/1,680	9/216/1,728	5,408
IB	700/1,300	50/500	200/200	98/1,680	9/216/1,728	5,408
	400/1,000	50/500	500/500	98/1,680	9/216/1,728	5,408
IIA	650/1,400	0	0	98/1,680	11/264/2,112	5,192
IIB	500/700	50/500	200/200	98/1,680	11/264/2,112	5,192
	200/400	50/500	500/500	98/1,680	11/264/2,112	5,192
IIIA	500/1,050	0	0	98/1,680	12/288/2,304	5,034
IIIB	350/350	50/500	200/200	98/1,680	12/288/2,304	5,034
	50/50	50/500	500/500	98/1,680	12/288/2,304	5,034
IVA	200/650	0	0	98/1,680	13/312/2,496	4,826
IVB	0	50/500	150/150	98/1,680	13/312/2,496	4,826

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* Mobiles responding to Strategic Warning
** Mobiles responding to Tactical Warning

against the HMLs would be costly because the unfavorable RV exchange ratio for the attacker could be 20-to-1. Based on this ratio, 4,000 RVs would be required to attack 200 Small ICBMs, while 10,000 RVs would be required to barrage 500 Small ICBMs.

Constraints on ICBM inventories under START would be such that in the absence of a Soviet breakout, a barrage attack against U.S. mobile missiles would achieve only limited success. For example, a selective or partial barrage attack using all of the 1,540 deployed SS-18 weapons might result in the destruction of about 38 percent of the 200 HMLs deployed or 15 percent of the 500 HMLs deployed. In contrast, a breakout could add 6,660 ballistic missile warheads (excluding spare SS-18s), and that size barrage attack would be effective against 200 HMLs, while the addition of the spare SS-18 warheads (2,156) would be required for the breakout force to be effective against 500 HMLs.

Although it is debatable whether or not the Soviets would use their entire breakout force in a barrage attack against mobile missiles, if that attack is combined with a silo attack and if it comes with only tactical warning, then the ICBM leg of the U.S. Triad would be completely eliminated, regardless of which U.S. force structure was deployed. Despite these dire, worst case consequences, U.S. retaliation would still be assured because, as shown in Table 13, the Soviets would still have to face 1,680 alert bomber warheads and between 1,728 and 2,496 warheads deliverable by U.S. submarines at sea.

A Soviet breakout based on the force structure shown in Table 11 rather than Table 10 would not differ substantially from that shown in Table 12 even if the proposed U.S. limits on nondeployed mobiles (NDMs) were used. That proposal, which has not been agreed to, would limit NDMs to 300, with a maximum of 1,500 attributable warheads. That number of warheads on spare delivery vehicles could be achieved in the following manner:

	Legal Spare Delivery Vehicles		Total Warheads On Spare Delivery Vehicles
SS-24 Rail	133 x 10	=	1,330
SS-25 Land	167 x 1	=	167
	300		1,497

By limiting those Soviet spare missiles which are the easiest to move and set up clandestinely, namely the nondeployed mobile missiles, the United States would hope to face no more than about 1,500 excess warheads over deployed levels, assuming that verification methods worked perfectly and prevented the Soviets from adding other nondeployed missiles and warheads to a rapid breakout. This, then, would be a best case breakout scenario from a defense point of view because the 1,500 additional Soviet warheads would not provide them with the capability to successfully barrage either 200 or 500 dispersed Small ICBMs.

D. Comparative Analysis

Referring back to Table 13, we can see that except for Option IA the Soviets could use their treaty-limited forces

to attack U.S. hard-silo targets, and in that one exception, they would only need to upload their SS-18s to their maximum capacity. Therefore, with respect to the survivability of the hard-silo force, no single option stands out above the rest.

The alert bomber force size is identical across all the options and, therefore, that leg of the Triad cannot be used as a basis for comparing the options. Similarly, the mobile missile forces in Options IB, IIB, and IIIB are identical and, alone, they also provide no basis for comparison. Nevertheless, the mobile missiles hold the key to deterrence because of their prompt striking power and their ability to survive under most circumstances. For these reasons, we would expect that the United States would benefit from choosing one of the options containing mobiles, even though under a worst case scenario the Soviets might be inclined to break out in order to counter the mobile missiles.

A choice between Options IB, IIB, and IIIB initially would involve the question of how many U.S. SSBNs must be on patrol at any one time to ensure a deterrent policy for that Triad leg. As mentioned before, if that number is kept high, the ICBM Triad leg and, in particular, the U.S. silo-based missiles, would be reduced in number significantly. To avoid this consequence, one of the middle options (IIB) might be preferred over the rest.

Next, the question of 200 or 500 Small ICBMs would have to be addressed. Costs will undoubtedly play a large role in resolving that question, but here we are more concerned with the strategic implications associated with that choice. Referring again to Table 13, we see on the one hand that if a force of 200 Small ICBMs were selected in Option IIB, then 500 hard-silo aimpoints would be available

to draw down a total of 1,000 SS-18 RVs. On the other hand, by selecting 500 Small ICBMs rather than 200, the United States would have fewer hard-silo aimpoints (200) to draw down SS-18s, but it would have made the successful execution of a Soviet barrage attack considerably more difficult.

The final criterion for selecting an option could hinge on what some might call the "minimum deterrence"--the minimum number of nuclear weapons required across the U.S. Triad to ensure deterrence. Some experts such as John Steinbruner of Brookings [quoted in Ref. 1] believe that each leg of the Triad must be independent and able to contribute at least 500 survivable warheads in a retaliatory strike. The U.S. bombers on alert as well as the submarines at sea could easily satisfy this requirement, but it would be more difficult for a constrained ICBM force.

Based on this last criterion, we can see from Option IIB that the 500 Peacekeeper RVs aboard dispersed railcars could survive on strategic warning and compensate for the loss of 400 silo-based RVs during a nuclear attack rideout. If 500 Small ICBMs are deployed, they could compensate for the loss of both the silo-based and rail-based missile force when only tactical warning is available. Under these circumstances, the ICBM leg could contribute to the above definition of minimum deterrence (see Table 14).

We should note that the Small ICBM force does not necessarily have to be vulnerable to a Soviet breakout barrage attack, nor does its deployment have to be viewed as encouraging such an attack. One way for the United States to discourage a Soviet breakout that is designed to use the extra weapons for a barrage attack is to make such

TABLE 14
COMPARISON OF TYPICAL
START FORCE STRUCTURES

	U.S.			USSR		
	No.	Real Warheads	Counting Rule Warheads	No.	Real Warheads	Counting Rule Warheads
Bombers	264	4,592	1,092	275	4,100	800
ICBMs (Silo)	200	400	400	154	1,540	1,540
ICBMs (Mobile)	550	1,000	1,000	416	1,100	1,100
SLBMs	432	3,456	3,456	404	2,216	2,216
START Totals	1,446	9,448	5,948	1,249	8,956	5,656

an attack's success impossible to achieve. This can be accomplished by deploying and randomly moving the Small ICBM HMLs on Government land and then dispersing them on warning far enough so that they could not be encompassed by the barrage.

Under these circumstances, the Soviets would need to hide their breakout intentions completely; otherwise, the United States could, at the least, disperse its Small ICBMs within a few minutes of strategic warning, and as a last resort, launch a responsive strike against the entire Soviet force. Therefore, a breakout attempt could place the Soviets at considerable risk, especially if all they hoped to achieve was the capability to barrage the Small ICBM missiles under tactical warning conditions.

IV. CONCLUSION

This analysis has discussed the implications of a Soviet breakout on the different U.S. strategic force structure options being considered for deployment under START. After examining the matchup between an illustrative Soviet START force and each of the four force structure options identified by the Bush Administration, we conclude that a Soviet breakout would not be necessary and might, in fact, be counterproductive.

Because of the complex counting rules envisioned for START, both sides can retain about 9,000 to 11,000 real warheads (down from the current 12,000), although they will probably be distributed within the opposing triads in a slightly different manner. Therefore, as a result of START, neither side would have a significant decrease in target coverage capability. The Soviets would deploy 1,540 SS-18 hard-target RVs aimed at U.S. silos, which would most likely be deployed in numbers much less than 1,000, while the United States would carry about 50 percent of its warheads on bombers (see Table 14).

The analysis results show that, although the Soviets might be inclined to break out if they believed that they could use the augmented force to barrage the Small ICBM as well as to attack the U.S. Minuteman in silos and Peacekeeper in the rail garrisons, they would still have to face the U.S. bombers on alert that escaped the missile attack as well as the U.S. nuclear submarines at sea. Moreover, issues yet to be resolved in START could reduce the chances for a large, rapid breakout. Therefore, we conclude that while a breakout might achieve some degree of success against one leg of the Triad in a worst case scenario, the possibility of its detection by the United

States and the subsequent consequences might not be worth the risk to the Soviets.

Also, we believe that a Soviet breakout designed solely to barrage the Small ICBM could be discouraged by the U.S. deployment of at least 500 of those missiles in such a way that a barrage attack would have a low probability of success. Random movement of the Small ICBM HMLs in the desert southwest and wide dispersal on strategic warning are the basic ingredients for that to be accomplished. Then, even if tactical warning alone was received, the random starting location of each HML would obviate a Soviet smart barrage and necessitate a costly blind barrage with only a limited chance for success.

Finally, we recognize that while the democratization of Eastern Europe, the Soviet willingness to reduce their present military forces and enter into further arms reduction talks (START II), and, most importantly, the apparent end to the Cold War are all good reasons to believe that a possible Soviet breakout would be improbable, past history of dealing with the Soviets demands that the United States approach this new era with caution. Numerical balance between strategic forces and compliance with treaty limits can be achieved in many different ways, as was shown by the variety of U.S. force structure options examined above, but we should quickly add that it is the effectiveness of these systems in preventing the Soviets from gaining a perceived advantage that is crucial. Therefore, the possibility and implications of a Soviet breakout should be examined and reexamined throughout the START process until an atmosphere of mutual trust is achieved and verification means are in place.

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